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| APPLICATION NO.                                                                        | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.   | CONFIRMATION NO. |
|----------------------------------------------------------------------------------------|-------------|----------------------|-----------------------|------------------|
| 10/678,799                                                                             | 10/03/2003  | Tobias Gerlach       | KOA 0242 PUS (R 1415) | 3893             |
| 22045                                                                                  | 7590        | 04/08/2004           | EXAMINER              |                  |
| BROOKS KUSHMAN P.C.<br>1000 TOWN CENTER<br>TWENTY-SECOND FLOOR<br>SOUTHFIELD, MI 48075 |             |                      | WEST, JEFFREY R       |                  |
|                                                                                        |             |                      | ART UNIT              | PAPER NUMBER     |
|                                                                                        |             |                      | 2857                  |                  |

DATE MAILED: 04/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/678,799

Applicant(s)

GERLACH, TOBIAS

Examiner

Jeffrey R. West

Art Unit

2857

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 12 January 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 10/03/03, 10/23/03.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The foreign references on the Information Disclosure Statement filed October 23, 2003, have not been considered because they are references corresponding to EP 1043590, listed on the Information Disclosure Statement filed October 03, 2003, and U.S. Patent Nos. 5,042,080 and 6,144,179 on the same Information Disclosure Statement.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 is considered to be vague and indefinite because it recites, "wherein each step is performed at each point in time of the digital sampling of the analog armature current signal". There is, however, no mention of any steps and therefore it is unclear to one having ordinary skill in the art as to what operations are to be performed at each point in time.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-4, 6, and 8-10, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,924,166 to Roussel in view of U.S. Patent No. 4,583,190 to Salb.

Roussel discloses a method for determining the frequency of current ripples contained in the armature current signal of a commutated direct current motor (column 1, lines 9-13) comprising determining an armature current signal, determining an electric operating parameter of the motor (i.e. signal taken across the terminals of a shunt), subtracting the armature current signal and the motor electric operating parameter from one another to determine the current ripples contained in the armature current signal (column 5, lines 28-33), and determining a current ripple frequency from the current ripples contained in the armature current signal (column 2, lines 43-50).

Roussel also discloses that the motor electric operating parameter is an armature voltage signal (column 4, lines 48-53) and the current ripple frequency is determined during a start-up phase of the motor (column 1, lines 42-45).

Roussel also discloses counting/monitoring the current ripple frequency for changes during operation of the motor wherein the number of ripples changes as a function of changes in the motor operation (column 1, lines 34-38).

As noted above, the invention of Roussel teaches many of the features of the claimed invention including determining both armature current and voltage signals to determine the frequency of current ripples in the armature current signal. Roussel does not, however, specifically determine a frequency spectral result of these current and voltage signals through digitization and a Fast Fourier transform.

Salb teaches a microcomputer-based system for performing Fast Fourier Transforms wherein the analog signals being analyzed are first digitized at each point in time and then analyzed using a fast Fourier transform to obtain a frequency spectral result (column 7, lines 46-48).

It would have been obvious to one having ordinary skill in the art to modify the invention of Roussel to include determining a frequency spectral result of these current and voltage signals through digitization and a fast Fourier transform, as taught by Salb, because this method for frequency analysis is well-known in the art to provide the user with easier mathematical analysis and, as suggested by Salb, would have provided more accurate analysis due to the signals being better defined in classical mathematical signal processing terms (column 7, lines 28-34).

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roussel in view of Salb and further in view of U.S. Patent No. 5,359,275 to Edwards.

As noted above, the invention of Roussel and Salb teaches many of the features of the current invention including determining a current ripple frequency by subtracting an armature current from a motor parameter, but the combination does

not specify that the motor parameter be a second current signal of a different operating state.

Edwards teaches a load current fundamental filter with one cycle response including a means for calculating a current ripple wherein the current ripple is determined by subtracting the current at a first state from the current at a second state (column 10, lines 16-20).

It would have been obvious to one having ordinary skill in the art to modify the invention of Roussel and Salb to include a means for determining the current ripple by subtracting the current at a first state from the current at a second state, as taught by Edwards, because Edwards suggests a well-known and functionally equivalent method for determining the current ripple while obtaining good approximations of the current harmonics (column 4, lines 48-64).

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roussel in view of Salb and further in view of U.S. Patent No. 6,459,223 to Mauel et al.

As noted above, the invention of Roussel and Salb teaches many of the features of the current invention including determining a position of the motor based upon a the current ripple frequency, but does not specify determining the speed based upon the current ripple and calculating the position from the speed.

Mauel teaches a motor vehicle door lock and process for its control including means for determining a counting the number of current ripples and from this count determining the rotary speed or other parameters (column 3, lines 15-20), such as

the angular position (column 27-31). Also, while the invention of Mauel does not specify that the position is calculated from the determined speed, the Examiner takes Official Notice that it is very well known to determine the position of a drive shaft from its speed with easy calculations (see for example, U.S. Patent No. 4,952,854 to Periou et al., column 2, lines 45-50 and U.S. Patent No. 5,988,846 to Flamm et al., column 16, lines 9-13).

It would have been obvious to one having ordinary skill in the art to modify the invention of Roussel and Salb to include determining the speed based upon the current ripple and the position from the speed, as taught by Mauel, because Mauel suggests that the combination would have provided a functionally equivalent method for determining the motor position information from a current ripple, as is the intent of Roussel and Salb, with high accuracy, reliability, and simple structure (abstract and column 6, lines 6-15).

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

U.S. Patent No. 5,770,922 to Gerrish et al. teaches a baseband V-I probe that receives input voltage and current signals which are digitized and sent to a digital signal processor that computes the amplitudes and relative phase of the signals using a Fast Fourier Transform.

U.S. Patent No. 6,002,228 to Knab teaches a device for electronically controlling a motor vehicle displacement mechanism including a means for evaluating the waviness of the armature current of the electric motor in order to detect the position, wherein the waviness is defined as a ripple count of the peaks or periods.

U.S. Patent No. 4,275,451 to Balzarini et al. teaches a method of and apparatus for testing of mass-produced articles including a sensing means has the capability of counting successive periods of the ripple signal during a predetermined time interval for indicating the rotary speed

U.S. Patent No. 4,491,770 to Gotou teaches a brushless DC motor including a means for detecting current ripple during motor startup and acceleration.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey R. West whose telephone number is (571)272-2226. The examiner can normally be reached on Monday through Friday, 8:00-4:30.

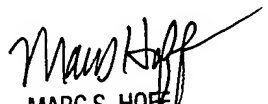
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (571)272-2216. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jrw  
April 1, 2004

  
MARC S. HOFF  
SUPERVISORY PATENT EXAMINER  
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